

## I. Introduction

The purpose of this report is to describe the burden of asthma in the State of Washington. In this report we explain why asthma is an important public health issue, describe who has asthma, and provide information about the quality of healthcare for people with asthma as well as information about environmental exposures that cause asthma or increase asthma attacks.

This information can be used to help prioritize asthma prevention and control within the spectrum of Washington public health concerns, as well as to provide information needed for asthma prevention and control planning throughout Washington State.

### *What is asthma?*<sup>1</sup>

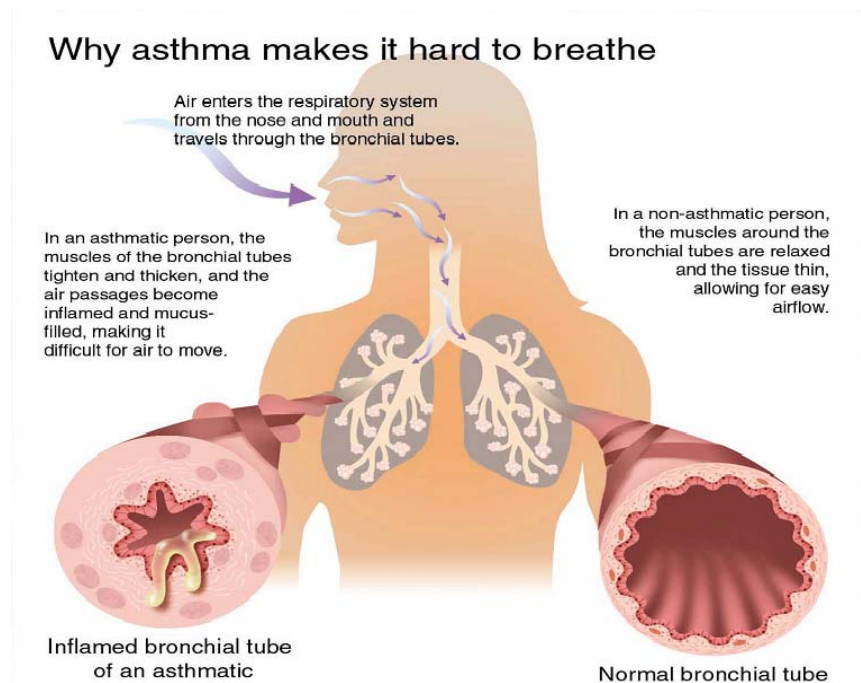
Asthma is a chronic inflammatory disorder of the airways which is associated with airway hyper-responsiveness, airflow limitation and respiratory symptoms. The American Thoracic Society definition for asthma is the most widely cited to describe asthma. They define asthma as a disorder with the following characteristics, not all of which need be present to assign the diagnosis of asthma.

#### **Airway Obstruction**

Narrowing that is reversible (but not completely so in some patients) either spontaneously or with treatment.

#### **Airway inflammation**

**Airway hyper-responsiveness to a variety of stimuli.**



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Five key indicators for asthma diagnosis have been identified by the National Asthma Education and Prevention Program (NAEPP) expert panel, however, they are by

<sup>1</sup> Text to define asthma was primarily adapted from the *National Asthma Training Curriculum*, CD-ROM educational resource, Centers for Disease Control and Prevention, National Center for Environmental Health and the Academy of Allergy, Asthma and Immunology, August 2004.

themselves a diagnosis. If multiple indicators are present then it increases the probability of asthma. The key indicators of asthma are:

1. Wheezing, especially in children
2. History of cough (especially at night), recurrent wheeze, recurrent shortness of breath, difficult, labored breathing, or recurrent chest tightness
3. Reversible airflow limitation, happening at varied times during the day, that can be measured by using a peak flow meter
4. Symptoms that occur or worsen in the presence of exercise, viral infection, animals with fur or feathers, house-dust mites, mold, smoke, pollen, changes in weather, strong emotional expression, airborne chemicals/dusts, and/or menses
5. Symptoms that occur or worsen at night, awakening the patient.

#### **Asthma Exacerbations**

Attacks or worsening of asthma symptoms and lung function are acute and can have a rapid onset or can occur gradually over time.

Bronchial asthma in the untreated state is recognized by recurrent episodes of airflow limitation usually reversible spontaneously or with appropriate treatment. Symptoms of airway limitations can be breathlessness, wheezing, chest tightness and/or cough.

There are four forms of airflow limitation related to inflammation in the airways:

#### **Airway Wall Swelling**

In untreated asthma, the inner lining of bronchi and bronchioles becomes inflamed and thickened, causing narrowing of the central air passage.

#### **Acute Bronchoconstriction**

Bronchoconstriction is caused by contraction of the smooth muscle that surrounds the airways. Bronchoconstriction, or bronchospasm, is most likely to occur in the presence of intense inflammation. Such bronchospasm causes the openings in the air passages to narrow even more.

#### **Chronic Mucus Plug Formation**

The overproduction of mucus in the inflamed airway causes plugs. The plugs are comprised of mucus secretion, exuded serum proteins, and cell debris. This aggravates the airflow limitation caused by the other processes described.

#### **Airway Remodeling**

Airway remodeling refers to an alteration in the composition of the airway wall. It occurs in some patients, usually those with longstanding asthma. Normal components are replaced by less functional substances, similar to scar tissue replacing normal tissue. This form of airway obstruction may be persistent and may not respond to treatment.

Asthma can range from being an intermittent nuisance triggered by specific factors, such as allergen exposure or exercise, to being a severe, progressive, and occasionally fatal

disease without apparent external cause. This diversity has led to a growing appreciation that asthma, as currently defined, probably is not a specific disease, but a syndrome with multiple causes leading to a common clinical presentation involving reversible airway obstruction.

We know that family history contributes to susceptibility, but in most cases we don't know what causes asthma to develop, and we don't know how to cure asthma. People with asthma can control it by knowing the warning signs of an attack, avoiding things that trigger an attack, and following the advice and prescriptions of their doctor. When asthma is controlled people that have it do not have symptoms like wheezing or coughing, they sleep better, don't miss work or school, and can take part in physical activities.<sup>i</sup>

### *Why is asthma a public health priority?*

The costs of asthma are unnecessarily high. Uncontrolled asthma results in loss of life, hospitalizations, and significant healthcare costs. Symptoms not severe enough to require a visit to the emergency department (ED) or to a physician can still substantially impair quality of life. Asthma results in many lost nights of sleep, disruption of family and caregiver routines, and restricted activities. Asthma is the leading work-related lung disease; and recent evidence suggests that at least ten percent, and up to 26 percent in some regions, of adult-onset asthma may be work-related.<sup>ii,iii</sup> Chapter II in this report describes the cost of asthma with regard to death, hospitalization, economic costs, and quality of life.

### *What are the rates of asthma?*

This report generally describes the “prevalence” of asthma, which is the percentage of people who have the condition at a single point in time. This is different from the “incidence” of asthma, which is the rate at which people within a population develop a new case of the condition over a specific period of time (such as one year).

Asthma prevalence has increased significantly over the past three decades. Reasons for this rise in prevalence are unclear and likely related to several factors. Although many triggers of asthma attacks in people with asthma are well recognized, causes of the initial development of asthma among those who did not previously have asthma are poorly understood. Family history of asthma, exposure to viral infections during infancy, environmental factors, and socio-economic factors are all suspected to be involved in the development of asthma.

The reported prevalence of asthma is dependent upon diagnosis of the condition. It is quite possible for people to suffer from asthma without being appropriately diagnosed. For example, one study of children conducted in Seattle found a physician-diagnosed asthma prevalence of 11.5% but the prevalence of wheezing without a diagnosis of asthma was 7.3%, suggesting that the actual asthma prevalence rate may have been nearly 40% higher than reported.<sup>iv</sup> Data in this report also suggest that the actual prevalence of asthma may be greater than reported – youth data presented in Chapter IV

also show that more students report asthma symptoms than have been diagnosed with asthma.

### *What kinds of people have asthma?*

Chapter III in this report describes the prevalence of asthma in Washington, both overall and among people of different ages, genders, race/ethnic groups, and different communities. In Chapter IV we identify important risk factors that individual people can avoid to minimize their risk for developing asthma or making their asthma worse. Generally, data are presented separately for youth and adults because data systems collect information separately for youth and adults using telephone and school-based surveys.

### *What can we do about asthma?*

Interventions that may be effective for asthma prevention include minimizing exposures that cause asthma (sometimes called “asthmagens”). The greatest number of people can be reached efficiently by changing policies and systems rather than by educating people one by one. This includes helping policymakers to understand what rules or practices they can change in communities, worksites, schools, and home domains to improve asthma. Chapter V describes the current status of policies and practices in these domains that affect exposure to agents that cause or worsen asthma.

For people who already have asthma we can make sure that they receive the best treatment for and information about their disease. This means that healthcare providers follow “clinical guidelines” for asthma control – recommendations from experts about what medications, advice and education patients should receive. People with asthma can also be educated about making sure their environments are free from exposures that can worsen asthma symptoms or cause an asthma attack (sometimes called “triggers”). In Chapter VI we provide information about clinical services to control asthma and information about the presence of triggers for people with asthma in Washington.

In this section we will use the terms “asthma control” and “asthma management” interchangeably. Recently, the term “control” has become more widely used to emphasize that symptoms from asthma really can be minimized or even eliminated by aggressive clinical and self-care.

### *What are health disparities?*

A “health disparity” occurs when a group of people are unfairly affected by a health condition. Due to systematic failures in disease prevention, diagnosis or treatment, certain populations may have higher risk for developing asthma or effectively controlling their disease. Additional discussion of asthma disparities is included in Chapter VII.

### *Where do we go from here?*

The Centers for Disease Control and Prevention (CDC) has identified “Healthy People 2010” goals to strive for in controlling asthma. These goals are presented throughout this report in gray boxes, and may indicate the extent to which Washington aligns with national benchmarks for asthma and health.

The report conclusion in Chapter VIII indicates that information in this report is being used by a statewide planning group to develop combined strategies for asthma prevention and control in 2005. These strategies will set the direction for health advocates statewide to conduct asthma programs in 2005-2010.

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i Centers for Disease Control and Prevention: National Center for Environmental Health Asthma Fact Sheet. <http://www.cdc.gov/asthma/faqs.htm> accessed 11-18-04.

ii Arif AA, Delclos GL, Whitehead LW, Tortolero SR, Lee ES. 2003. Occupational exposures associated with work-related asthma and work-related wheezing among US workers. *Am J Ind Med.* Oct;44(4):368-76.

iii Youakim S. 2001. Work-related asthma. *American Family Physician.* Dec 1;64(11):1839-48.

iv Maier WC, Arrighi HM, Morray B, Llewellyn C, Redding GJ. The impact of asthma and asthma-like illness in Seattle school children. *Journal of Clinical Epidemiology.* 1998;51(7):557-68.